LASER-INDUCED FLUORESCENCE AND DISPERSED-FLUORESCENCE SPECTROSCOPY OF JET-COOLED CALCIUM MONOALKOXIDE RADICALS

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Laser-induced fluorescence (LIF) and dispersed-fluorescence spectroscopy (DF) spectroscopic investigations of $\tilde{A} \leftarrow \tilde{X}$ transitions of a series of calcium monoalkoxides, including $CaOCH_3$, $CaOCH_2CH_3$, and $CaOCH(CH_3)_2$, have been carried out. The free radicals were produced by laser ablation of a calcium rod in the presence of alkohols under jet-cooled conditions. Dominant transitions in the vibrationally resolved LIF and DF spectra obtained by pumping the orgin bands are reproduced using Franck-Condon (FC) factors calculated by complete active space self-consistent field (CASSCF) as well as coupled cluster (CC) methods. DF spectra obtained by pumping other vibronic bands in the LIF spectra provide valuable information about the FC matrices and aid the assignment of vibronic transitions. The (pseudo-)Jahn-Teller effects introduce transitions that are not predicted using the harmonic oscillator approximation.